

Mapline

A newsletter published by

The Hermon Dunlap Smith Center for the History of Cartography at the Newberry Library

edited by Sarah Adair Frank

Numbers 106-107 Summer 2008

Ptolemy's *Geography* and Renaissance Mapmakers:

A Catalogue and Guide to the Exhibition at the Newberry Library



2.3 "Tabula Europ Sexta Italiae" (Europe 6) in Claudius Ptolemy, [*Geographia*] (Strasbourg, 1513).

In the fall and winter of 2007-08, Chicago was home to the Festival of Maps, a citywide exploration of the history and culture of mapmaking. Over thirty cultural and scientific institutions showcased exhibitions of hundreds of maps in a wide range of themes from understanding the habitable world to the portrayal of imaginary lands. The Festival's centerpiece was "Maps: Finding our Place in the World," a joint project of The Field Museum and the Newberry Library. Mounted at The Field Museum from 2 November 2007 to 27 January 2008, the exhibition featured

130 maps from around the world, including a number of key items from the Newberry's Collection.

The Newberry Library was pleased to contribute two exhibitions to the festival featuring the Library's extensive cartographic collections. "Mapping Manifest Destiny: Chicago and the American West" examined the role of maps in envisioning the American frontier. Curators Michael Conzen and Diane Dillon selected over sixty maps and views to illustrate this complex theme. A catalogue of "Mapping Manifest Destiny" published by the Newberry

Library is currently available through the University of Chicago Press or from the Newberry's A.C. McClurg Bookstore.

A second exhibition, "Ptolemy's *Geography* and Renaissance Mapmakers," is the subject of this special double issue of *Mapline*. Co-curated by Robert W. Karrow, Jr., the Library's Curator of Maps, and James Akerman, Director of the Smith Center, the exhibition featured a high percentage of the Newberry's renowned collection of Renaissance editions of what is arguably the most important geographical and cartographic book of all time, the *Geography* of the ancient Alexandrian scholar, Claudius Ptolemy. Nearly all of these editions came to the Newberry as part of the Edward E. Ayer Collection, the early foundation of the Newberry's map and geography collections.

Between its opening 3 November 2007 and its closing on 14 December 2007, "Ptolemy's *Geography*" attracted over 7,000 visitors. We received many requests for a more permanent record of this exhibition for the benefit of both those who visited and those who could not. Consequently, we present the full exhibition text here along with reproductions of many of the exhibited items.

Generous support for Ptolemy's *Geography* was provided by Christie's, the corporate sponsor of the exhibition. Additional support was provided by Ken and Jossy Nebenzahl.

We are particularly grateful for the hard work of the Exhibits and Conservation departments and other staff and former staff at the Newberry: Ray Clemens, Jennifer Dominiak, Riva Feshbach, Catherine Gass, Susan Hanf, Megan Moore, John Powell, Lauren Reno, and Giselle Simon.

Finally, we wish to extend our grateful acknowledgement of three private lenders who most generously loaned items to the exhibition: the anonymous lender of the 1477 Bologna edition of the *Geography*, Roger Baskes, and Arthur Holzheimer.

Introduction

The Renaissance ideal that "good" maps should be based on direct observation and compiled according to mathematical and scientific rules and standards has not only governed the way we make maps, but also the way in which we view the world. The "rediscovery" of Claudius Ptolemy's *Geography* (or *Geographia*) by Renaissance scholars lies at the center of this story. Originally composed in the second century CE, the *Geography* described in words, tables of geographic locations, and maps the entire *oikoumene*, or habitable world as Ptolemy knew it, in unrivaled detail. But it was equally important as a model for mapmaking. Many of the fundamental ideas about modern cartography are

traceable to the *Geography* and its interpretation by Renaissance geographers.

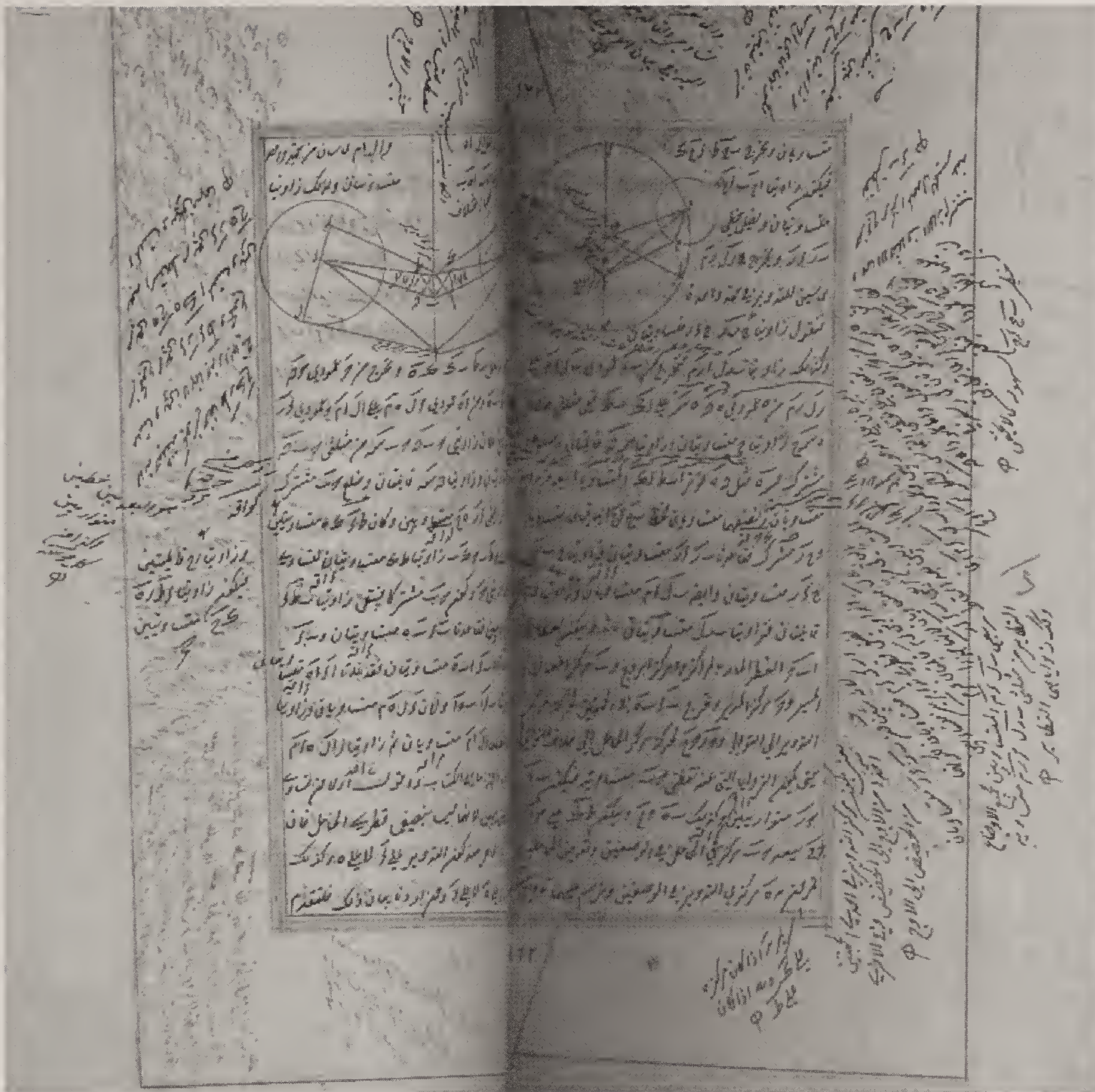
By looking at numerous editions of the *Geography* published throughout the Renaissance we can trace Ptolemy's influence on the way maps were produced and published, and on Europeans' view of the wider world. At the same time, we can see how the *Geography* was transformed by some of the greatest geographical thinkers and mapmakers of the age, who were responding to the world-changing events of the 15th and 16th centuries.

The Newberry's renowned cartographic collection includes nearly all of the printed Renaissance editions of the *Geography*. Most of the editions were acquired by Edward E. Ayer and given to the Library with the bulk of his Collection in 1911. We have arranged highlights from this collection chronologically and geographically. As you move through the exhibit text presented here in full, you will not only trace the Renaissance interpretation of Ptolemy's work, but will also make a circuit around Ptolemy's world as represented by 26 regional maps that form the Ptolemaic canon.

Section 1: Ptolemy and his *Geography* to 1500

The astronomer, mathematician, and geographer Claudius Ptolemy (ca. 90-168) lived in Alexandria, Egypt, which for many centuries was the cultural, political, and scientific center of the eastern Mediterranean. It was in Alexandria in the third century BCE that Eratosthenes perfected a method for accurately measuring the circumference of the earth and first explained how to construct maps based on parallels of latitude and meridians of longitude. In Ptolemy's day, Alexandria was a part of the Roman Empire and his *Geography* integrated Greek geometry with the Romans' extensive, practical knowledge of the world. The Greek word "geography" literally means writing the world. For Ptolemy, it meant what we call mapmaking or cartography; the *Geography* is essentially a mapmaking manual.

As with so many classical works, we know the *Geography* only through medieval Greek copies; there are no known extant ancient Greek copies. This important work was virtually unknown during the Middle Ages in Western Europe, although it clearly influenced the great works of Islamic cartography as early as the ninth century. The earliest extant Greek manuscript (without maps) dates to about 1200, and by the late 13th century Greek copies with maps were circulating in Constantinople, capital of the Byzantine Empire. The Renaissance versions of the *Geography* trace their lineage to these copies. The first Latin translation, by Jacopo d'Angelo, was finished about 1406-09, and thereafter it was widely circulated in manuscript form within scholarly and elite circles in Europe.



1.2 Tahrir al-majisti [an abbreviated version of the Almagest], manuscript by Nasir ad-Din at-Tusi, 1666.

1.1 (not pictured)

[Geographike hyphegesis], manuscript by Claudius

Ptolemy, 14th century, Constantinople (?). Ayer MS 743, Edward E. Ayer Collection, Newberry Library, Chicago.

Ptolemy wrote his *Geography* in Greek, and the oldest surviving copies are written in Greek as well. The largest part of the work consisted of tables of coordinates for some 8,000 places all over the known world. He would only have personally calculated a handful of locations; most of them were derived from observations made by other astronomers and travelers. Ptolemy gave his coordinates in the form of degrees of latitude north or south of the equator and in degrees of longitude east of his prime meridian (the Fortunate Islands, now the Canaries).

Like the Romans, ancient Greeks used letters to express numbers. The line of text reproduced for the exhibit records the location of Zizootra (Dizootra, Cappadocia, in what is now eastern Turkey) at latitude $38 + \frac{1}{2} + \frac{1}{4}$ degrees north, longitude 70 degrees east ($38^{\circ}45'$ N, 70° E).

1.2 (above)

Tahrir al-majisti [an abbreviated version of the Almagest], manuscript in Arabic by Nasir ad-Din at-Tusi, 1666.

Ayer MS 745, Edward E. Ayer Collection, Newberry Library, Chicago.

Ptolemy was primarily known to medieval scholars through his astronomical work, the *Mathematike Syntaxis* (Mathematical Treatise), which synthesized Greek astronomical knowledge. It was translated into Arabic as early as the ninth century, acquiring the name *Kitab-al majisti* or "The Great Book," and later into Latin under the title *Almagest* (a corruption of the Arabic title). All through the late medieval period and the Renaissance, the Ptolemaic earth-centered universe as described in the *Almagest* held sway until the idea of a sun-centered universe, advanced by Copernicus, was accepted in the 17th century.

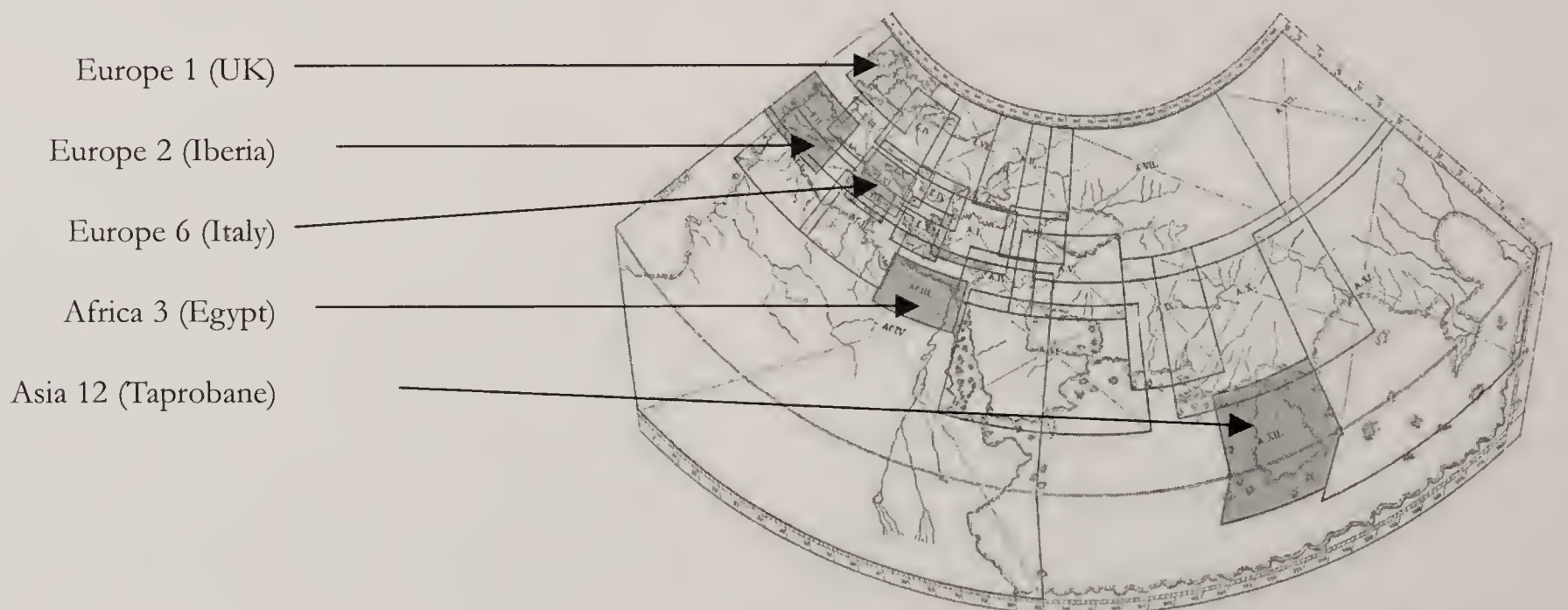


A. E. Nordenskiöld, Index map of the 26 regional maps of the Ptolemaic canon, in his *Facsimile-Atlas to the Early History of Cartography* (Stockholm: P.A. Norstedt, 1889).

This index map was prepared by the great historian of cartography A. E. Nordenskiöld in 1889, based on the world map included in the edition of the *Geography* published in Rome in 1507-1508. It locates the 26 regional maps that, with the world map, comprise the Ptolemaic canon: 10 maps to cover Europe, 4 for Africa, and 12 for Asia. Nordenskiöld outlined these regions on his index map and

we have identified some of them for you in the image below.

In general one “reads” Ptolemy’s world from west to east, or left to right, much as one reads a page of written text in a Western language. This assumes, correctly, that Ptolemy’s maps are oriented with north at the top, an arbitrary convention that the *Geography* helped to establish.





1.4 "Prima tabula" (Europe 1), copperplate engraving, in Claudius Ptolemy, [*Geographia*] (Bologna, 1477).

1.3 (not pictured)

[Tables of coordinates for Europe 1] in Claudius Ptolemy, *Cosmographia*, edited by Angelus Vadius and Barnabas Picardus (Vicenza: Hermanus Levilapis [Herman Lichtenstein of Cologne], 1475). Ayer *6 P9 1475, Edward E. Ayer Collection, Newberry Library, Chicago.

This is the first printed edition of the *Geography*. Unlike most of the subsequent editions, it does not have any maps; it does have Ptolemy's tables of coordinates for over 8,000 places in the world known to the Greeks. The coordinates are expressed in terms of their distance north or south of the equator (latitude) and their distance east or west of a prime meridian (longitude). Portions of a degree are counted in fractions, not in minutes as is the modern convention. Ptolemy was not the first to suggest that all places on the surface of the earth could be denoted in this way, but no one before him had compiled the latitude and longitude of so many places.

The publication of these tables in the Renaissance was revolutionary. Through the medium of print, they changed forever the way people mapped their world. Even today's Global Positioning Systems (GPS) devices rely on the idea that all points on the surface of the earth can be described according to a uniform geometrical system.

1.4 (above)

"Prima tabula" (Europe 1), copperplate engraving, hand colored, in Claudius Ptolemy, [*Geographia*], edited by Philippus Beroaldus, Angelus Vadius, and others, maps by Taddeo Crivelli (Bologna: Dominicus de Lapis, 1477). Private Collection. Loan arrangements by Cohen & Taliaferro LLC, New York, NY. Reprinted with permission.

Several editions of the *Geographia* with maps were planned in the 1470s. The first to appear was this edition, printed in Bologna in 1477. Painter and illustrator Taddeo Crivelli drew these maps using Ptolemy's coordinates. This edition



1.5 “Secunda Europe tabula” (Europe 2), copperplate engraving, in Claudius Ptolemy, [*Geographia*] (Rome, 1478.)

was made using copperplate engraving, and these were the first maps ever published using this technique. Only 26 copies of this exceedingly rare edition are known to exist worldwide; it is the only printed edition of the *Geography* not present in the Newberry’s collections.

Ptolemy’s first regional map is devoted to the British Isles. There have been several attempts to explain why Scotland is drawn perpendicular to the rest of the island. One plausible explanation is that Ptolemy’s data conflicted with the ancient Greek paradigm for the habitable earth. Most Greek geographers agreed that an island called Thule (“Thile Insula”) lay at the highest habitable latitude, 63 degrees, beyond which the seas were frozen solid. Ptolemy’s data on the size of Scotland would have extended it farther north than Thule. Depicting Scotland at this angle allows for the size of the landmass recorded by Ptolemy to fit within the habitable world defined by his contemporaries.

1.5 (above)

“Secunda Europe tabula” (Europe 2), copperplate engraving, in Claudius Ptolemy, [*Geographia*], edited by Domitius Calderinus, map engraver unknown (Rome: Arnold Buckinck, 1478). Ayer *6 P9 1478, Edward E. Ayer Collection, Newbery Library, Chicago.

This edition of the *Geography*, first published in Rome in 1478, was quite successful: three subsequent editions of it appeared in 1490, 1507, and 1508. One reason for its success may have been the superior quality of its map plates: the lettering was applied to the copperplates with punches, rather than being engraved.

Ptolemaic maps of regions that were part of the Roman Empire routinely indicated the names and extent of Roman provinces, such as “Hispania Lusitania” (modern Portugal). Clearly, this information did not correspond with 15th-century political geography, and many Florentine manuscript copies of the *Geography* added new maps (*tabulae modernae* or *tabulae novellae*) that incorporated updated political and geographical information.



1.6 "Hispania novella," in Claudius Ptolemy, [*Geographia*] (Florence, 1480-1482).

1.6 (above)

"Hispania novella," copperplate engraving, hand colored, in Claudius Ptolemy, [*Geographia*], translated and with maps by Francesco Berlinghieri (Florence: Nicola Todescho [Nicolaus Laurentii], 1480-1482). Ayer *6 P9 B5 1480b, Edward E. Ayer Collection, Newberry Library, Chicago.

Between 1480 and 1482, Francesco Berlinghieri prepared the first printed edition of the *Geography* with significant alterations to Ptolemy's text and maps. To begin with, Berlinghieri translated the Latin text into *terza rima*, a style of

verse commonly used in pedagogical texts in the Renaissance. Furthermore, he included *tabulae modernae*—four new maps covering the areas of the Ptolemaic maps Europe 1 (British Isles), Europe 2 (Iberia), Europe 6 (Italy), and a portion of Asia 4 (the Holy Land).

Berlinghieri's "Hispania novella" and other new maps of Mediterranean countries clearly benefited from the highly accurate coastal information conveyed by portolan charts. Another useful innovation was the replacement of the ancient Roman provincial divisions with the names and outlines of modern kingdoms and principalities, including Granada, the last Islamic kingdom on the peninsula (conquered by Christian Spain in 1492).

1.7 (not pictured)

“Tertia Europe tabula” (Europe 3), woodcut, hand colored, in Claudius Ptolemy, [*Geographia*], based on a manuscript edited and with maps by Donnus (Dominus) Nicolaus Germanus (Ulm: Lienhart Holle, 1482). Ayer *6 P9 1482b, Edward E. Ayer Collection, Newberry Library, Chicago.

This edition was copied almost verbatim from a manuscript by **Nicolaus Germanus** (see sidebar). It is the first edition of the *Geography* to be printed outside Italy, and the first to use woodcut maps, the technique favored in Germany. Coloring was applied by hand to early printed maps and often varies from copy to copy. We know that all copies of this edition were colored at the direction of the publisher, Lienhart Holle, because all extant copies use the same palette. It was such an expensive undertaking that Holle went bankrupt in about 1484.

This is the third Ptolemaic map of Europe, showing France. Caesar considered the Low Countries as constituting one of the three parts of Gaul (France), and you can see that Ptolemy’s France includes them under the name “Celtogalatia Belgica.”

Nicolaus Germanus
(fl. 1460-77)

The greatest editor of the *Geography* during the manuscript era (before 1500) was Nicolaus Germanus, a German who worked principally in Italy. Germanus is associated with twelve known manuscript copies prepared from the 1460s through the 1480s. The differences between them show that Germanus was no mere copyist, but actively modified and improved upon Ptolemy’s work. His early manuscripts include new maps (*tabulae modernae* or *tabulae novellae*) of Iberia, Italy, and Scandinavia.

It is believed that his manuscripts were the models for all but one of the 15th-century printed editions of the *Geography*. In a very real sense, then, the *Geography* as Europeans came to know it by 1500 was largely the presentation by Germanus of Ptolemy’s world. His influence is most easily traced in the early printed editions that use the trapezoidal projection he invented. Like Ptolemy, Germanus understood that meridians of longitude converge as they approach the poles. (The length of a degree of longitude is about 69 miles at the equator, but only about 49 miles at 45° N.) On his regional maps Germanus laid his meridians out as straight lines that are not parallel to each other, but converge towards the poles, giving the maps a unique trapezoidal shape.

1.8 (not pictured)

“Quarta Europe tabula” (Europe 4), woodcut, hand colored, in Claudius Ptolemy, [*Geographia*], based on a manuscript edited and with maps by Donnus (Dominus) Nicolaus Germanus (Ulm: Johann Reger, 1486). Ayer *6 P9 1486, Edward E. Ayer Collection, Newberry Library, Chicago.

Johann Reger, successor to the bankrupt publisher Lienhart Holle, printed this edition of the *Geography* in 1486. Because the maps were printed from Holle’s original woodblocks, this is known as the second Ulm edition.

The fourth Ptolemaic map of Europe (Germany) covered most of Central Europe. In Ptolemy’s day the territories on this map were the troublesome German lands lying just beyond the Roman frontier, which roughly followed the Rhine (at left) and the Danube (at the bottom) rivers. The features that look like brown mottled caterpillars crawling across the map are mountain ranges.

1.9 (not pictured)

“Quinta Europe tabula” (Europe 5), copperplate engraving, in Claudius Ptolemy, [*Geographia*], edited by Domitius Calderinus, map engraver unknown (maps from plates used for the 1478 edition) [Rome: Petrus de Turre, 1490]. Ayer *6 P9 1490, Edward E. Ayer Collection, Newberry Library, Chicago.

The fifth Ptolemaic map of Europe includes the Roman provinces between the Danube River and the Adriatic Sea. The degrees of latitude are marked in the frame of the map. Notes in the margins refer to two different ways Ptolemy might have reckoned latitudes. The first method was based on the ancient Greek system of climates—parallel horizontal bands approximately 140 miles wide that circled the globe. In the other method, any change in the north-south direction would be finely calibrated to the length of a day. By knowing the length of the longest day at a specific location, Ptolemy was able to calculate latitude. Thus, the marginal note on the right says that the 45th degree of latitude is also the “19th parallel, differing from the equator by 3½ hours and with the longest day being 15½ hours.”



1.10 Ptolemaic world map on the 1st projection (Rome, ca. 1490-1500).

1.10 (above)

Ptolemaic world map on the 1st projection, copperplate engraving by unidentified mapmaker (Rome: Petrus de Nobilis, ca. 1490-1500). Novacco 4F 003, Franco Novacco Map Collection, Newberry Library, Chicago.

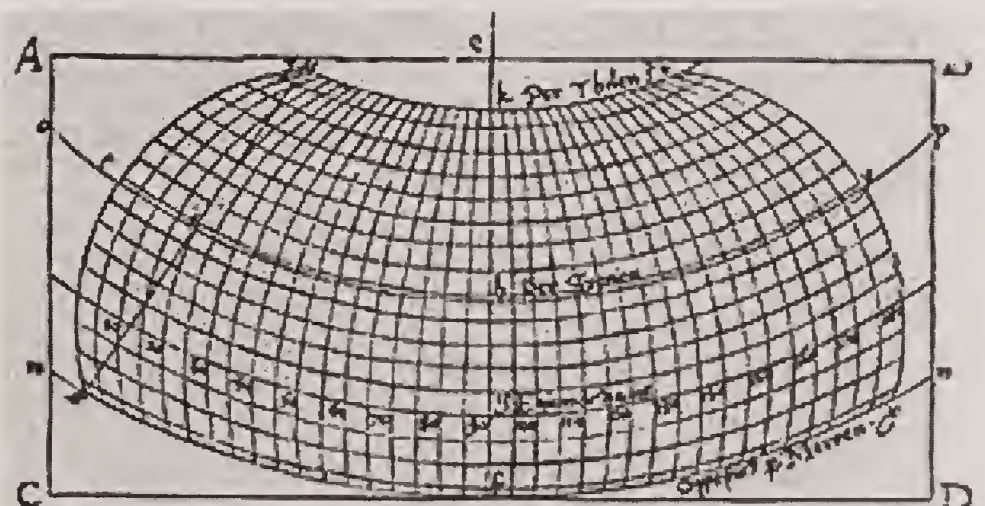
Ptolemaic world maps do not purport to show the entire globe, only the *oikoumene*, or that portion thought by the ancient Greeks to be inhabited. In strict geometric terms these maps cover only about 180° of longitude and 80° of latitude (or about one-quarter of the surface of the earth). The abrupt way in which Ptolemy's *oikoumene* ends in every direction indicates that he acknowledged the possibility that there may be more lands beyond the depiction. Inspired by Ptolemy and by the need for new ways to represent new geographical information, cartographers would develop many new projections over the course of the next century.

This copy of the Ptolemaic conic world map is extremely rare, known in only three surviving copies.

1.11 (lower right)

Detail showing the 2nd projection, woodcuts, in Claudius Ptolemy, [*Geographia*], translated by Willibald Pirckheimer, with annotations by Regiomontanus, edited by Johann Huttich, maps by Laurent Fries (from woodblocks used for the 1522 edition) [Strasbourg: Johannes Grüninger, 1525]. Ayer *6 P9 1525, Edward E. Ayer Collection, Newberry Library, Chicago.

Ptolemy, like all ancient astronomers, was perfectly aware that the earth was a sphere. He states that the best kind of map would be a globe or a section of a globe. Recognizing that this was often impractical, he suggests two methods for constructing projections onto a two-dimensional surface that will allow places to be plotted according to their latitude and longitude, and will at least suggest the appearance of a curved surface. In his first projection (conic), the parallels of latitude are curved while the meridians of longitude are straight lines that converge at the North Pole. In the second projection (homeotheric or equal area) pictured below, both the parallels and meridians curve and thus clearly suggest a spherical surface. The Renaissance mapmakers employed both types, but were also inspired by Ptolemy's example and explanation of the geometry involved to develop new projections of their own.



1.11 Graphic explanation of 2nd projection, in Claudius Ptolemy, [*Geographia*] (Strasbourg, 1525).

1.12 (lower left)

World map, woodcut, hand colored, in Claudius Ptolemy, [*Geographia*], based on a manuscript edited and with maps by Donnus (Dominus) Nicolaus Germanus (Ulm: Lienhart Holle, 1482). Ayer *6 P9 1482a, Edward E. Ayer Collection, Newberry Library, Chicago.

This world map from 1482 was drawn using Ptolemy's second, or homeotheric, projection. This projection had the advantage of more closely representing the curvature of the earth and preserved the relative sizes of the lands and seas shown on the map. A distinctive feature of Ptolemaic world maps is that the Indian Ocean is shown as an enclosed sea, the Indian subcontinent is a barely noticeable peninsula, and the island of Sri Lanka (south of India) is shown much larger than its actual size.

Because of the difficulty of determining longitude, the west-to-east dimension of the world represented here was exaggerated by almost 25%, and Ptolemy underestimated the size of the entire earth by approximately 17%. In this context, it should be noted that Christopher Columbus possessed a copy of the *Geography* published in Rome in 1490, and that his grossly inaccurate estimate of the distance between the west coast of Europe and the east coast of Asia was influenced by Ptolemy's calculations.

Section 2: Mapping an Expanding World, 1500-1569

When Columbus landed in the Bahamas in October 1492 he believed (partly on Ptolemy's authority) that he had landed off the coast of Asia, and he died in 1506 still firmly holding this belief. By that time, however, some of his contemporaries were beginning to realize that Columbus had in fact discovered what was, to them, an entirely new world. The impact of this realization was immense.



1.12 World map, in Claudius Ptolemy, [*Geographia*] (Ulm, 1482).

Although new geographic data overturned Ptolemy's assumptions about the *oikoumene*, the *Geography* remained relevant. As a compendium of geographical knowledge about the Old World it was still mostly unsurpassed. As a manual for mapmakers, the principles and techniques it detailed were crucial for standardizing the ways in which the great discoveries and the expansion of Europe were charted. Each of Ptolemy's Renaissance editors, however, fundamentally altered the ancient geographer's work, improving and updating it, but also injecting more of themselves and more of the tastes and interests of 16th-century Europeans.

2.1 (lower right)

World map by Johannes Ruysch, copperplate engraving, in Claudius Ptolemy, [*Geographia*], edited by Marcus Beneventanus and Johannes Cota, engraver of Ptolemaic maps unknown (Rome: Bernardinus Venetus de Vitalibus, 1508). Ayer *6 P9 1508, Edward E. Ayer Collection, Newberry Library, Chicago.

Some 15 years after Columbus reached what he thought was Asia, the publisher of this edition of the *Geography* commissioned a new world map to illustrate recent discoveries. For this purpose he hired an otherwise unknown cartographer named Johannes Ruysch, whose world map appeared in the 1508 Rome edition (although a few copies were printed early, in 1507). Ruysch attempted to show the entire circumference of the earth while still accepting Ptolemy's longitudes. As a result, there was very little space to include the Atlantic and Pacific oceans, or to insert the Americas between Europe and Asia. South America appears at the bottom of the lefthand page. What little was known of North America appears as a cluster of islands in the center of the page and, to the north, as an extension of Asia.



2.1 World map by Johannes Ruysch, in Claudius Ptolemy, [*Geographia*] (Rome, 1508).

2.2 (below)

[World map], woodcut, with lettering from inserted type, in Claudius Ptolemy, [*Geographia*], edited and with maps by Bernardo Silvani (Venice: Jacobus Pentius de Leucho, 1511). Ayer *6 P9 1511a, Edward E. Ayer Collection, Newberry Library, Chicago.

A few years after Ruysch's world map (see 2.1) was published, another Renaissance editor took a more radical approach to updating Ptolemy's world. Rather than adding a set of alternative new maps, Bernardo Silvani updated the Ptolemaic maps by "correcting" coordinates and redrawing maps so that they conformed to contemporary ideas of how the world looked. He did, however, present two world maps, one essentially Ptolemaic, and the map shown here, which extends Ptolemy's *oikoumene* to the west, south, and east. To the west we find an emergent South America, Cuba, Hispaniola, and Newfoundland. To the south, Silvani has completed the outline of Africa in the Southern Hemisphere. And to the east are Japan, the Malay Peninsula, and the major islands of the East Indies. With the names of regions and seas in red, Silvani's edition is an early example of the use of color printing in a map.

2.3 (pictured on page 1)

"Tabula Europ Sexta Italiae" (Europe 6), woodcut, in Claudius Ptolemy, [*Geographia*], edited by Matthias Ringmann and Martin Waldseemüller, maps by Waldseemüller (Strasbourg: published by Jacobus Aeszler and Georg Übelin, printed by Johann Schott, 1513). Ayer *6 P9 1513, Edward E. Ayer Collection, Newberry Library, Chicago.

When Renaissance mapmakers followed Ptolemy's table of coordinates for his sixth map of Europe (Italy), the result was a map that presented the end of the peninsula east of its actual location, and with a boot heel and toe that appear misshapen to 21st-century viewers. This woodcut edition

was printed in Strasbourg in 1513, and edited by one of the most influential cartographers of the era, **Martin Waldseemüller** (see sidebar). Waldseemüller's Ptolemaic maps are unusually detailed, but he did not trouble here to outline the ancient Roman provinces. To redress this deficiency, an early owner of this copy has named and colored in the provinces and their boundaries.

2.4 (not pictured)

Tabula Terre Nove, woodcut, hand colored, from Claudius Ptolemy, [*Geographia*], edited and with maps by Martin Waldseemüller (Strasbourg: J. Schott, 1513). Arthur Holzheimer Collection.

Martin Waldseemüller added 20 new maps to his edition of the *Geography*, the largest complement of entirely new maps included in any edition up to that time. While previous editors had paired each of their new maps with the appropriate Ptolemaic counterpart, Waldseemüller presented all of his new maps together as a supplement at the back of his volume. The supplement included a world map, nine general maps of Europe, four of the Rhine Valley, three of Asia, two of Africa, and *Tabula Terre Nove* or "Map of the New Land."

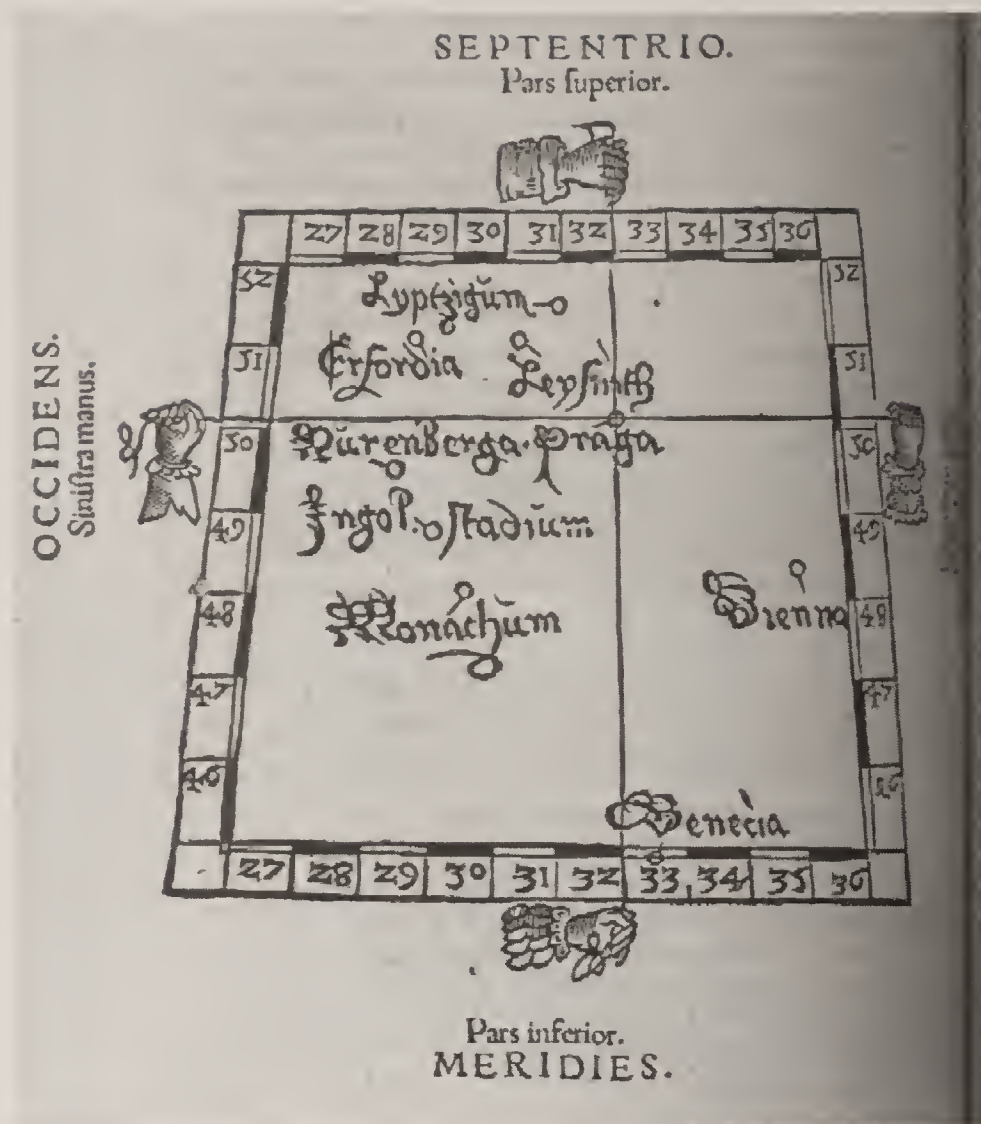
Waldseemüller's Map of the New Land shows the discoveries of Christopher Columbus, Pedro Álvares Cabral, Amerigo Vespucci, Juan de la Cosa, and others. "Isabella" (Cuba), "Spagnolla" (Hispaniola–Haiti and the Dominican Republic), and the Gulf of Mexico are depicted in disproportionate sizes.

Martin Waldseemüller (1470-1521?)

Humanist, cleric, and cartographer, Martin Waldseemüller is best known to us as the author of the 1507 world map that was the first to name the New World "America," in the mistaken belief that it had been discovered by Amerigo Vespucci. Waldseemüller's maps and books show that he was a skilled geographical scholar, and one of the first to fully comprehend that what Christopher Columbus and his immediate successors had discovered was in fact a new world whose existence could not be reconciled with the ancient world view represented by Ptolemy. Shortly after completing his world map in 1507, he began working with his friend Matthias Ringmann on a new edition of Ptolemy's *Geography*, which was eventually published in Strasbourg in 1513 by another friend, Johann Schott. Waldseemüller's *Geography* was the most ambitious edition yet published, and included a large quantity of new maps of all parts of the world, including America. Waldseemüller was not directly identified as the author of the maps, but his role as such is widely accepted—he is considered to be the only author within his scholarly circle capable of the work.



2.2 World map, in Claudius Ptolemy, [*Geographia*] (Venice, 1511).



2.6 Diagram showing the use of coordinates for finding places on a map, in Peter Apian and Gemma Frisius, *Cosmographicus liber* (Antwerp, 1529).

2.5 (not pictured)

“Tabula VII Europ” (Europe 7), woodcut, in Claudius Ptolemy, [*Geographia*], edited by Lorenz Fries, maps by Martin Waldseemüller, reduced by Lorenz Fries (Strasbourg: Johannes Grüninger, 1522). Ayer *6 P9 1522, Edward E. Ayer Collection, Newberry Library, Chicago.

This edition was edited by Strasbourg physician Lorenz Fries, whose principal contribution was to further disseminate the cartographic work of Martin Waldseemüller, though Fries did not credit the latter. Fries created essentially revised copies of maps made by Waldseemüller, such as this one of Sicily and Sardinia which comprises the seventh Ptolemaic map of Europe. It may surprise us that these two islands, large though they may be, should merit a separate map in Ptolemy’s scheme, as from our point of view they belong with Italy. In the ancient and medieval worlds, however, these islands possessed distinct political and cultural identities. Mount Aetna, in northern Sicily, is shown with flames emerging from its sides, as if to depict an always-active volcano.

2.6 (above)

[Diagram showing the use of coordinates for finding places on a map], woodcut, in Peter Apian and Gemma Frisius, *Cosmographicus liber Petri Apiani mathematici, studiose correctus, ac erroribus vindicatus per Gemmam Phrysiun*

(Antwerp: Rolland Bollaert, 1529). Ayer *7 A7 1529, Edward E. Ayer Collection, Newberry Library, Chicago.

By the middle of the 16th century, the eagerness for new geographical information inspired the creation of new geographical compendia, or cosmographies. The content of these works varied. Most of them offered some combination of mathematical geography (including what we would call astronomy), summaries of world and regional geography, and instructions for the construction of maps. Perhaps the most important of these new cosmographies was the *Cosmographia liber* by the mathematician Peter Apian, first published in 1524. This 1529 edition was updated by Gemma Frisius. Here Apian’s simple diagram explains how to find the latitude and longitude of a place by reading a regional map.

2.7 (not pictured, for Michael Servetus see sidebar)

“Tabula VIII Europ” (Europe 8), woodcut, hand colored, in Claudius Ptolemy, [*Geographia*], translated by Willibald Pirckheimer, edited by Michael Servetus (Villanovanus), maps by Martin Waldseemüller, reduced by Lorenz Fries (from woodblocks used for the 1522 edition) [Lyons: Melchior and Gaspar Trechsel, 1535]. Ayer *6 P9 1535a, Edward E. Ayer Collection, Newberry Library, Chicago.

The eighth Ptolemaic map of Europe represents Sarmatia (modern Poland, Belarus, Ukraine, and much of European Russia). The island “Scania” in the northwest is probably modern Bornholm, Denmark. Ptolemy’s geographical knowledge is noticeably weak concerning this region: the land between “Paludes Meotides” (the Sea of Azov) in the south and “Mare Sarmaticum” (the Baltic Sea) is far too narrow. The seated figure in the upper right-hand corner is the “Great Emperor Cham, greatest citizen of Casana”; this is a reference to the great khan or ruler of Tartary. Below him and to the left is the “Fons Tanais” or source of the Don River.

2.8 (not pictured)

“Tabula Europae IX” (Europe 9), woodcut, hand colored, in Claudius Ptolemy, *Geographia universalis*, edited and with maps by Sebastian Münster (Basel: Henricus Petri, 1540). Roger Baskes Collection.

Sebastian Münster (see sidebar) was the dominant European geographer of the mid-16th century. For his 1540 edition of the *Geography*, he carefully prepared the Ptolemaic maps and added 21 modern maps of his own making. His text was based on the Latin translation of the *Geography* prepared by Willibald Pirckheimer in 1525, but Münster also consulted other translations, including the first printed Greek edition (lacking maps), edited by Erasmus in 1533.

The ninth Ptolemaic map of Europe shows the ancient

**Michael Servetus
(1511-1553)**

A brilliant but contentious thinker, Spanish physician and religious reformer Michael Servetus published a book in 1531 on "The Errors of the Trinity" which angered both Catholics and Protestants. He was summoned to appear before the Spanish Inquisition, but he refused and remained in France. There he met John Calvin, found work as a proofreader for the publishing house of Treschel, and produced an edition of the *Geography* in 1535. In the text of this edition, he included this remark about the Holy Land:

Know, however, most worthy reader, that it is mere boasting and untruth when so much excellence is ascribed to this land; the experience of merchants and others, travelers who have visited it, proving it to be inhospitable, barren, and altogether without amenity. Therefore you may say that the land is promised, indeed, but it is of little promise when spoken in every-day terms.

In 1553, Servetus was tried for heresy, primarily for his denial of the Trinity. Even though the comment on the bareness of the Promised Land was copied verbatim from another author, Willibald Pirckheimer, it was included in the evidence against him. His death at the stake, at the hands of Calvin and his allies, demonstrated that Protestants, too, could be staunch in their suppression of heresy.

provinces of Dacia, Moesia, and Thrace, comprising most of modern Romania and Bulgaria and parts of northern Greece and western Turkey. Byzantium (as Istanbul/Constantinople was called in Ptolemy's time), the great city guarding the entrance to the Black Sea and the land passage from Europe to Asia, is shown near the center of the right-hand side of the map.

2.9 (not pictured)

"Europae tabula decima" (Europe 10), woodcut, in Claudius Ptolemy, *Geographia universalis*, edited by Michael Servetus (Villanovanus), maps by Martin Waldseemüller, reduced by Lorenz Fries (from woodblocks used for the 1522 edition) [Lyons: Gaspar Trechsel, 1541]. Ayer *6 P9 1541, Edward E. Ayer Collection, Newberry Library, Chicago.

This edition of the *Geography* offers for the first time a "Tabula Ptolemaei," an alphabetical index to Ptolemy's place-names keyed to the printed tables, not to the maps. As might be expected, Ptolemy's description of ancient Greece, with which Alexandria had such close ties, is highly detailed; with over 500 toponyms, the map of Greece has more place-names than any other European map.

2.10 (not pictured)

"Colonia Agrippina civitas amplissima," in Sebastian Münster, *Geographiae*, woodcut by Conrad Schnitt (Basel: Henricus Petri, 1552). Ayer *7 M8 1552, Edward E. Ayer Collection, Newberry Library, Chicago.

2.11 (not pictured)

"Aphricae Tabula I" (Africa 1), woodcut, in Claudius Ptolemy, *Geographia universalis*, edited and with maps by

Sebastian Münster (Basel: Henricus Petri, 1542). Ayer *6 P9 1542, Edward E. Ayer Collection, Newberry Library, Chicago.

In Ptolemy's time, North Africa, as part of the Mediterranean heartland, was much better known and more "civilized" than most of Europe. The Ptolemaic canon includes four maps of Africa, three showing the Mediterranean coast from west to east and one showing what was known of the rest of the continent. In Sebastian Münster's 1542 edition of the *Geography*, the first map of Africa shows the Roman province of Mauritania. It was divided into two subprovinces, as shown by the straight vertical line on the left side of the map. In his Africa 1, 2, and 3, Münster added an illustration of a shipwreck, usually interpreted as one of the three shipwrecks that befell St. Paul. Here, a storm engulfs the ship.

2.12 (not pictured)

"Aphricae Tabula II" (Africa 2), woodcut, in Claudius Ptolemy, *Geographia universalis*, edited and with maps by Sebastian Münster (from woodblocks used for the 1540 edition) [Basel: Henricus Petri, 1545]. Ayer *6 P9 1545a, Edward E. Ayer Collection, Newberry Library, Chicago.

With his 1545 edition of the *Geography*, Münster increased the number of modern maps by 5, bringing the total to 26, only 1 fewer than the original canon of 27 Ptolemaic maps. All of Münster's Ptolemaic maps include a handy alphabetical list of cities and towns in a special cartouche. This Ptolemaic map, "Aphricae Tabula II" (Africa 2), depicts the Roman province of Africa, comprising parts of today's Tunisia and Libya. The story of the shipwreck begun in Africa 1 continues here, where we see St. Paul cast from his ship.

**Sebastian Münster
(1488-1552)**

The phrase "Renaissance Man" was coined with people like Sebastian Münster in mind. Ordained as a Catholic priest, this clergyman converted to Protestantism in 1529. He also held a post as a professor of Hebrew at the University of Basel, Switzerland, and was one of the foremost Hebraicists of the 16th century. Early in his career he specialized in the translation and editing of ancient texts, including geographical and historical texts of Solinus and Pomponius Mela, and the first German edition of the Hebrew Bible. Münster's interests and publications also included mathematical treatises, studies of time and the motions of the planets, as well as maps and geography.

His edition of the *Geography* was the most popular edition of the mid-16th century, appearing in six editions. The culmination of Münster's lifetime of work, however, was clearly his *Cosmographia universalis*, first published in 1544. This work was the first serious modern rival to Ptolemy's *Geography* as a geographical authority. Münster steadily expanded his *Cosmographia*, adding to the work the Ptolemaic and modern maps from his *Geography* and woodcut views of cities. In all, the *Cosmographia universalis* was one of the most successful books of the Renaissance, published in 24 editions over the course of 100 years.

Giacomo Gastaldi
(ca. 1500-1566)

For the first half of the 16th century, cartography as a whole was dominated by Germans, who favored woodcut printing. By 1560, Italians had become the pre-eminent map producers in Europe, thanks in part to the superior aesthetic qualities of their copper-engraved maps. So it was in Italy for the first time that detailed maps of parts of the modern world were prepared and published to be sold, not as mere accompaniments to texts, but as consumer items in their own right.

Venetian cartographer Giacomo Gastaldi was a central figure in this development. Gastaldi, who grew up in the northwestern Italian province of Piedmont, was an engineer when he came to Venice and began to produce maps. Gastaldi was a prolific cartographer (over 100 maps are attributed to him) and his works are noted for his careful use of geographical sources and their exquisite execution. He was widely copied by competitors in Venice and Rome. Indeed, we may presume that Gastaldi, who became the official “cosmographer” of the Venetian government, more than any other cartographer of his day was responsible for broadening the popularity of printed maps, putting the most recent geographic information at the fingertips of an ever-larger number of Europeans.

2.13 (not pictured)

“Aphricae Tabula III” (Africa 3), woodcut, in Claudius Ptolemy, *Geographia universalis*, edited and with maps by Sebastian Münster (from woodblocks used for the 1540 edition). Ayer *6 P9 1545, Edward E. Ayer Collection, Newberry Library, Chicago.

The third Ptolemaic map of Africa shows what is now Egypt and eastern Libya. Alexandria, Ptolemy’s home, remained the intellectual center of Egypt, but Cairo (known to the Romans as Babylon-in-Egypt) had become a large and strategic military capital of the Roman Empire. Farther south along the Nile is the city of Ptolemais. This is one of several cities of the ancient world to be founded and named after the Ptolemaic dynasty. This dynasty, not to be confused with our geographer-hero, ruled Egypt after Alexander the Great until the time of Cleopatra.

Here, the unfortunate sailor shown earlier on Africa 1 and 2 is being devoured by a fish, which makes us wonder whether he is not to be identified as Jonah, rather than St. Paul.

2.14 (opposite page)

“Tabula Africae IV” (Africa 4), copperplate engraving, in Claudius Ptolemy, *La Geografia*, translated by Pietro Andrea Mattioli, maps by Giacomo Gastaldi (Venice: Nicolo Bascarini for Giovanni Battista Pedrezano, 1548). Ayer *6 P9 1548, Edward E. Ayer Collection, Newberry Library, Chicago.

This small, copper-engraved edition is celebrated because it features maps by the great Italian cartographer **Giacomo Gastaldi** (see sidebar). Begun around 1542, it was apparently Gastaldi’s first cartographic project, although the edition did not appear until 1548. For the first time, new

“supplemental” maps (a total of 34) outnumbered those of the Ptolemaic canon. The Italian text of this edition is essentially a translation of Münster’s edition.

The fourth Ptolemaic map of Africa shows the entire continent as known to ancient cartographers. The land ends at the “Mountains of the Moon,” reportedly the source of the Nile. South of these mountains supposedly lived the “anthropophagite” or man-eating people. The elephant near the center of the page exemplifies an emerging European trope in map illustration, immortalized by Jonathan Swift’s lines:

*So geographers, in Afric maps,
With savage pictures fill their gaps,
And o'er unhabitable downs
Place elephants for want of towns.*

2.15 (not pictured)

Giacomo Gastaldi, *Universale*, copperplate engraving (Venice, 1546). Novacco 4F 004, Franco Novacco Collection, Newberry Library, Chicago.

Giacomo Gastaldi’s *Universale* illustrates exactly how rapidly the European view of the world had changed in the 50 years since the first voyage of Columbus. Africa and South America, whose coasts had been well charted by this time, are quite recognizable in their modern forms. In contrast, knowledge of western North America was still limited. The large continent at the South Pole looks deceptively like Antarctica, but it was mere conjecture based mostly on the ancient Greek idea that a southern continent must exist to balance the continents of the northern hemisphere.

This beautifully engraved map, made in 1546, would serve as an influential model for world maps for the next two decades.

2.16 (not pictured)

“Tabula Asiae I” (Asia 1), woodcut, in Claudius Ptolemy, *Geographiae*, edited and with maps by Sebastian Münster, (from woodblocks used for the 1540 edition) [Basel: Henricus Petri, 1552]. Ayer *6 P9 1552, Edward E. Ayer Collection, Newberry Library, Chicago.

Asia, the largest continent, was allotted 12 maps in the Ptolemaic canon. The first, showing Asia Minor (Anatolia to the Greeks) is pictured here in yet another edition by Münster, which included virtually the same modern maps as his 1546 *Geography*. Anatolia (modern Turkey) had been home to the Hittites, and later to some of the most powerful early Greek states, whose names were adopted by some of the Roman provinces shown on this map. Indeed, here were the mythical site of Troy and the great urban centers of Miletus, Smyrna, Ephesus, and Nicea (modern Isnik). The latter two cities are remembered in church history as the address of Paul’s letter to the Ephesians and the site of the council that produced the Nicene Creed.



2.14 "Tabula Africae IV" (Africa 4), in Claudius Ptolemy, *La Geografia* (Venice, 1548).

2.17 (not pictured)

"Tabula Asiae II" (Asia 2) in Claudius Ptolemy, *La Geografia*, translated and edited by Girolamo Ruscelli, maps by Giulio and Livio Sanuto (Venice: Vincenzo Valgrisi, 1561). Ayer *6 P9 1561, Edward E. Ayer Collection, Newberry Library, Chicago.

The second Ptolemaic map of Asia shows the northern Caucasus and parts of Russia, an area populated in Ptolemy's time by a confederation of tribes called Sarmatians. The columns shown at the lower right were supposedly erected by Alexander the Great to indicate the limit of his travels, but no archaeological evidence of their existence has been found.

This edition uses an Italian translation from Ptolemy's Greek text by the humanist Girolamo Ruscelli. In addition to the Ptolemaic maps, this edition includes 36 new maps by

Giulio and Livio Sanuto (based on Gastaldi's work). Ruscelli placed these maps, which systematically covered the entire world, at the back of the book to accompany an extensive written commentary on and update of the Ptolemaic text.



Detail from *La Geografia*, title page, in Claudius Ptolemy, *La Geografia* (Venice, 1548).

2.18 (not pictured)

“Tabula Asiae III” (Asia 3), copperplate engraving, in Claudius Ptolemy, *La geografia*, edited by Giuseppe Moletto, maps by Giulio and Livio Sanuto (from plates used for the 1561 edition) [Venice, 1562]. Ayer *6 P9 1562, Edward E. Ayer Collection, Newberry Library Chicago.

The third Ptolemaic map of Asia shows Armenia and the neighboring Caucasian kingdoms to the north, all lying between the Black Sea to the west and the Caspian Sea to the east. The small lake marked “Fons Euphratis” in the center of the map marks the source of the Euphrates River, in the Roman province of Armenia Major. To the north are Iberia and Albania, the Greco-Roman names for two independent kingdoms just beyond the effective boundaries of the Roman Empire (not to be confused with ancient Spain and modern Albania). On Ptolemy’s maps, as on most others until the 17th century, the Caspian Sea is given a pronounced east-west orientation. The maps are again those drawn by the Sanuto brothers, but this time the textual editor was Giuseppe Moletto, who preceded Galileo as the chair of mathematics at Padua.

2.19 (not pictured)

“Tabula Asiae IIII” (Asia 4), copperplate engraving, in Claudius Ptolemy, *Geographia*, edited by Guiseppe Moletto, maps by Giulio and Livio Sanuto (from plates used for the 1561 edition) [Venice, 1564]. Ayer *6 P9 1564a, Edward E. Ayer Collection, Newberry Library, Chicago.

The fourth Ptolemaic map of Asia shows the Middle East, bounded by the Mediterranean Sea, the Tigris River, the Taurus Mountains (to the north), and the Arabian Peninsula (to the south). This region, the cradle of Judaism, Christianity, and Islam, as well as the ancient civilizations of Mesopotamia, was of exceptional interest during the Renaissance. It is not surprising that many 16th-century editors decided to supplement this Ptolemaic map with a more current map of the Holy Land. The tents along the frontier of “Arabia Deserta” apparently refer to the nomadic peoples of Arabia.

The maps in this edition were made using the copperplates engraved by the Sanuto brothers for the Venice edition of 1561. These plates were used for no fewer than seven editions and lasted longer than those made by Münster.

2.20 (not pictured)

“Tabula Asiae V” (Asia 5), woodcut, in Strabo, *Rerum geographicarum libri septemdecim*, translated and edited by Guiljelmus Xylander, maps by Sebastian Münster (from woodblocks used for the 1540 edition) [Basel: Henricus Petri, 1571]. Ayer *6 P9 S7 1571, Edward E. Ayer Collection, Newberry Library, Chicago.

In 1571 publisher Henricus Petri used the Ptolemaic maps of Sebastian Münster (who had died in 1552) to illustrate an edition of the *Geography* based on the work of the ancient Greek geographer, Strabo.

This is the fifth Ptolemaic map of Asia, centered on today’s Iraq and Iran. At the lower left you can see Babylon (southeast of modern Baghdad) and below and to the right “Arae Herculis,” or the altar of Hercules, the supposed site of his one-year bondage during his third task. The “Porte Caspiae,” the Caspian Gates, near the center of the map refers to a narrow valley between two prominent mountains where Alexander the Great was said to have built a great gate or wall to keep out barbaric peoples. These mythical gates may have mistakenly been associated with actual fortifications built in Derbent, Dagestan, in the Russian Caucasus, far to the north.

Section 3: Ptolemy Reinvented as an Historical Atlas

In 1570 Abraham Ortelius published *Theatrum orbis terrarum* (“Theater of the Whole World”). His goal was to assemble the best modern maps he could obtain, from all parts of the world, and have them engraved to a uniform size and style for publication as a single book. Generally recognized as the first modern atlas, the *Theatrum* introduced a new cartographic paradigm. Ptolemy’s maps were no longer seen as authoritative, nor could a modern geographer even maintain that they provided a useful or necessary starting point for comprehending the modern world. Consumers desired maps that were relevant to modern events. Modern cartography became more self-consciously political and economic in orientation.

Nonetheless, Renaissance intellectuals retained a high regard for Ptolemy as an authority on ancient geography. Some Renaissance mapmakers continued to produce editions of the *Geography*, although most of them supplemented the Ptolemaic maps with modern maps. Gerard Mercator’s elegant 1578 edition of the *Geography* returned the work to its “original” content. He stripped away the texts and maps that had been added over the previous century and reinterpreted the Ptolemaic maps. In the process, Mercator recast Ptolemy exclusively as a historical source and completed the emergence of a new cartography oriented to modern European interests.

3.1 (pictured on page 20)

Abraham Ortelius, “Typus orbis terrarum,” copperplate engraving, in *Theatrum; oder Schaubbüch des Erdtkrejs* (Antwerp: Christoffel Plantin, 1580). Oversize Ayer G1006 .T515 1580, Gift of Martin D. Jahn, Edward E. Ayer Collection, Newberry Library, Chicago.

First published in 1570, the *Theatrum orbis terrarum* of Abraham Ortelius quickly found itself in the same geographical niche as the first editions of Ptolemy's *Geography* had 100 years earlier—it was seen as the authoritative picture of what the world looked like, and it held that rank for the rest of the century, with 24 editions published in Latin, Dutch, German, French, and Spanish before 1600.

This is the world map in the second German-language edition, published in 1580.

3.2 (not pictured)

“Asiae VI Tab.” (Asia 6), copperplate engraving, in Claudius Ptolemy, *Tabulae geographicae*, maps edited by Gerard Mercator (Cologne: Godefridus Kempen, 1578). Ayer *6 P9 1578, Edward E. Ayer Collection, Newberry Library, Chicago.

Gerard Mercator (see sidebar) had been engraving and publishing separate maps for 40 years by the time he produced this 1578 edition of the *Geography*. For some time, Mercator had been planning a new, unified collection of modern maps; however, before commencing his monumental modern work, he paid homage to the great master of ancient cartography, Claudius Ptolemy. Mercator's slim folio edition, included in this exhibit, is



Gerard Mercator, portrait from his *Atlas pars altera* (Düsseldorf, 1595).

dedicated to Ptolemaic maps; it does not include any of the Ptolemaic text or tables, only a brief introduction and a thorough index of the place names, keyed to the maps.

The sixth Ptolemaic map of Asia shows the Red Sea, the Arabian Peninsula, and the Persian Gulf. It is first-century geography presented in the best 16th-century idiom, complete with splendid italic lettering, an elaborate cartouche, and a sea monster.

3.3 (not pictured)

“Asiae VII Tab.” (Asia 7), copperplate engraving, in Claudius Ptolemy, *Tabulae geographicae*, maps edited by Gerard Mercator (Cologne: Godefridus Kempen, 1578). Ayer *6 P9 1578a, Edward E. Ayer Collection, Newberry Library, Chicago.

From another copy of Mercator's 1578 edition, here is the seventh Ptolemaic map of Asia, showing what is now Kazakhstan, Uzbekistan, Turkmenistan, and other areas lying south and east of the Caspian Sea (shown here with an east-west orientation commonly used by Ptolemy and later cartographers). This is roughly the route of the Silk Road. We can pick out the city of Samarkand (“Maracanda”) in Central Asia, and, further east, the Stone Tower (“Turris Lapidea”), thought of as the midpoint between China and the West and a place of great trade. Mercator has taken the liberty of showing us a caravan winding its way through the rugged Pamir Mountains into Chinese Turkistan.

Gerard Mercator (1512-1594)

Of all the cartographers who have ever lived, only Mercator has become widely recognized. His fame comes from the projection that bears his name, first used in his world map of 1569. This projection was popular with navigators on long voyages because it allowed any straight line drawn between two points on a map to serve as a rhumb line (a line of constant compass bearing).

Mercator was a towering figure in 16th-century cartography. An engraver and calligrapher of outstanding ability, he infused his maps with a humanistic style that became a standard for the craft. At the same time Mercator approached the task of geographical explanation methodically, which included acquiring a thorough knowledge of the work of previous mapmakers. He seemed to feel that before he could make a definitive book of modern maps, he had to produce the definitive edition of ancient maps. His *Geography* contained only maps, plotted carefully according to Ptolemy's coordinates, elegantly engraved, and with an alphabetical index to serve the needs of users. Mercator did not live to see his crowning achievement presented to the world; his *Atlas* (see “Asia” on page 18) was published in 1595 by his son Rumold. As evidence of the greatness of the work and its author, the title would become synonymous with “book of maps.”



“Asia” in Gerard Mercator, *Atlas* (Düsseldorf: A. Busius, 1595). Ayer *135 M5 1595, Edward E. Ayer Collection, Newberry Library, Chicago.

3.4 (not pictured)

“Tabula Asiae VIII” (Asia 8), copperplate engraving, in Claudius Ptolemy, *Geographiae universae*, edited and with maps by Giovanni Antonio Magini, maps engraved by Girolamo Porro (Venice: Heirs of Simone Galignani, 1596). Ayer *6 P9 1596, Edward E. Ayer Collection, Newberry Library, Chicago.

This is the 1596 Venetian edition of the *Geography* edited by Giovanni Antonio Magini, astronomer, chair of mathematics at Bologna, and compiler of the first large-scale atlas of Italy (published posthumously in 1620). Whereas most other Renaissance editors used a trapezoidal projection to make their Ptolemaic regional maps, Magini made the unusual decision to use Ptolemy’s second projection (homeotheric projection). See 1.11 for reference.

The eighth Ptolemaic map of Asia shows the extreme northeastern part of the *oikoumene*, which includes western China (“Serica” and “Sina”). Although the Ptolemaic world “stops” at 180 degrees east (about 162 degrees east of the Greenwich meridian), this regional map clearly indicates that Ptolemy understood that the continent continued beyond the limits of his geographical knowledge.

3.5 (not pictured)

“Tabula Asiae IX” (Asia 9), in Claudius Ptolemy, *Geografia*, copperplate engraving, edited by Girolamo Ruscelli, revised and enlarged by Giuseppe Rosaccio, maps by Guilio and Livio Sanuto (from plates used for the 1561 edition) [Venice: Heirs of Melchior Sessa, 1599]. Ayer *6 P9 1599, Edward E. Ayer Collection, Newberry Library, Chicago.

The 1599 Venetian edition of the *Geography* is the last printing of Ptolemaic maps using the plates engraved by Giacomo Gastaldi and the Sanuto brothers. It also reuses Ruscelli’s translation of Ptolemy’s Greek text into Italian,

which was first published in 1561. The area shown is basically Iran, Afghanistan, and Pakistan, along with the northwestern part of India, labeled “Indiae intra Gangem pars” (Part of India, before the Ganges River). “Badara,” along the coast, is probably meant to be the Persian word “Bandar” (port), a place-name common along the Iranian coast of the Persian Gulf.

3.6 (not pictured)

“Asiae X tab.” (Asia 10), copperplate engraving, in Claudius Ptolemy, [*Geographia*], edited by Petrus Montanus, maps by Gerard Mercator (from plates used for the 1578 edition) [Amsterdam: Cornelius Nicolaus and Jodocus Hondius, 1605]. Ayer *6 P9 1605a, Edward E. Ayer Collection, Newberry Library, Chicago.

On the tenth Ptolemaic map of Asia, the Indian Peninsula is distorted almost beyond recognition. It is largely by studying place-names that the subcontinent can be identified. For example, on the north shore of the large Bay of Colchicus (“Colchicus sinus”) is a place called “Colchi emporium.” This is known to be the ancient port of Korkai, which was near the southern tip of the peninsula, directly across the Gulf of Mannar from “Taprobane” (Sri Lanka). The “Maliarfa emporium” is presumed to be Mylapore (a section of Chennai, formerly Madras), which is actually several hundred miles up the coast from Korkai. It seems that this section of the Indian coast has been shifted from a north-south orientation to an east-west orientation, rather like what happened to Scotland in Europe 1 (see 1.4).

3.7a (not pictured)

“Asiae XI tab.” (Asia 11), in *Theatrum geographiae veteris*, edited by Petrus Bertius, maps by Gerard Mercator (Leiden: printed by Isaac Elzevier, Amsterdam, published by Jodocus Hondius, 1618). Ayer *6 P9 1618b, Edward E. Ayer Collection, Newberry Library, Chicago.

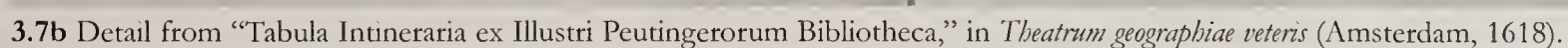
3.7b (opposite page)

“Tabula Itineraria ex Illustri Peutingerorum Bibliotheca” (Peutinger Map), in *Theatrum geographiae veteris*, edited by Petrus Bertius, maps by Gerard Mercator (Leiden: printed by Isaac Elzevier, Amsterdam, published by Jodocus Hondius, 1618). Ayer *6 P9 1618b, Edward E. Ayer Collection, Newberry Library, Chicago.

The eleventh Ptolemaic map of Asia depicts the very edge of the *oikoumene*. The place-name evidence indicates that Ptolemy’s information certainly extended to the Malay Peninsula and may have reached Borneo but was uncertain regarding what lay further east—in the country of the “Sinac” or the Chinese. This 1618 publication of the *Geography* is the fourth edition to use the plates Mercator made for his maps in the 1578 edition. The text is edited by Petrus Bertius, a historian, mathematician, geographer, and librarian.

“Tab. XII Asiae” (Asia 12), copperplate engraving, in Claudius Ptolemy, *Tabulae geographicae orbis terrarum veteribus cogniti*, maps by Gerard Mercator (from plates used for the 1578 edition) [Utrecht and Franeker: Franciscus Halma, 1698]. Ayer *6 P9 1698, Ayer Collection, Newberry Library, Chicago.

Published one hundred years after Mercator's death, this edition still uses the great geographer's copperplates, first made for his 1578 edition. The publisher's only change was to re-engrave the title cartouche.





3.1 Abraham Ortelius, "Typus orbis terrarum," in *Theatrum; oder Schaubüch des Erdtkrejs* (Antwerp, 1580).

Exhibit Conclusion

By the early 17th century, Ptolemy's *Geography* was relegated to serving as an authority on geography as an historical rather than a contemporary resource. Shaped by the world-changing events of the previous century, modern cartography focused on the here and now. No longer was there a scholarly or common perception that what one needed to know about the world could be found in the works of classical authors. New maps of virtually every part of the world, the successors of the first *tabulae modernae*, now circulated in such numbers that the old maps of the Ptolemaic canon had been cast aside—at least as useful representations of contemporary geography.

Yet throughout this transition, Ptolemy's work stood as the basis of modern geography and served as inspiration to the Renaissance mapmakers who sought to represent their modern and changing world with increased accuracy. Latitude and longitude, instrumental to the mapmaking instructions and geographical data Ptolemy presented in his *Geography*, remained the primary means of charting the

locations of specific places. Like Ptolemy, Mercator and other mapmakers developed projections to address the problem of correctly depicting the earth on a flat surface. Ptolemy in a sense charted the course for future mapmaking—without his guidance, later mapmakers would never have found their way.

The Hermon Dunlap Smith Center for the History of Cartography at the Newberry Library was founded in 1972 to promote the study of the history of cartography through public programs, research projects, fellowships, courses of instruction, and publications.

Mapline (ISSN 0196-1881) is the Center's newsletter. The cost of an annual subscription (three issues), inclusive of postage, is \$10 for delivery in North America, \$15 for all other subscribers. Back issues (as available) can be purchased for \$3.50 each. An index of past issues and text of selected articles are available on our Web site. Submissions of news items, lead articles, or review copies of recent books is encouraged, and should be sent to the attention of *Mapline* Editor at the address listed below.



The Hermon Dunlap Smith Center
The Newberry Library
60 West Walton St
Chicago IL 60610 USA
smithctr@newberry.org
www.newberry.org/smith/smithhome.html

